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10/586,923	07/24/2006	Koji Nitta	050395-0383	8240

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EXAMINER	
ROE, JESSEE RANDALL	
ART UNIT	PAPER NUMBER
1793	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/586,923	NITTA ET AL.	
	Examiner	Art Unit	
	Jessee Roe	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-29* is/are pending in the application.

4a) Of the above claim(s) *22-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *24 July 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 11-21, drawn to a drawn to a tungsten-carbide based metal structure, are currently under examination. Because the Applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP §818.03(a)). Claims 22-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method of manufacturing a tungsten-carbide based metal structure, there being no allowable generic or linking claim.

Specification

The disclosure is objected to because of the following informalities: “EXANMPLE 1” in lines 5 and 18 of page 14 and line 8 of page 17 should be changed to "Example 1".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 11-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the content of carbon" in line 2 of claim 11. There is insufficient antecedent basis for this limitation in the claim.

Claim 16 recites the limitation “the number of pools" in line 1 of claim 16. There is insufficient antecedent basis for this limitation in the claim.

With respect to the recitation “wherein the structure has a shape on the order of micrometers” of claims 17-21, it is unclear how a shape would be defined by a size (i.e. a micrometer size). Further, it is not clear what the metes and bounds are of the phrase, “on the order of micrometers”. For example, does this phrase mean 2, 4 10, 12 20… ,micrometers?

Examiner Interpretation

With respect to the recitation “wherein the structure has a shape on the order of micrometers” of claims 17-21, the Examiner notes that page 11, line 20 - page 12, line 2 elaborates on this claim language. The Examiner also notes that in line 21 of this section, "for example” is used. Therefore, the scope of the claims are not limited to the definition set forth at page 11, line 20 - page 12, line 2 and have been interpreted to include micrometer size particles.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-13 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Nilsson et al. (US 5,681,783).

In regards to claim 11, Nilsson et al. ('783) discloses a high density tungsten carbide based material (structure) having at least about 5.0 to 6.05 weight percent carbon and 0 to 0.20 weight percent cobalt (col. 4, lines 28-45 and col. 5, lines 47-56).

In regards to claim 12, Nilsson et al. ('783) discloses that the Vickers hardness would be at least about 2400 kg/mm^2 (abstract and col. 3, lines 49-55).

In regards to claim 13, Nilsson et al. ('783) discloses that the tungsten carbide material would have a density of at least about 97% of the theoretical density (abstract and col. 3, lines 48-55). Nilsson et al. ('783) further discloses that the theoretical density of the tungsten carbide containing material would be between 15.63 g/cm^3 and 17.15 g/cm^3 (col. 13, lines 29-41). 97% of these values is 15.16 g/cm^3 and 16.64 g/cm^3, which would be greater than 10 g/cm^3.

With respect to the recitation "wherein the structure has a shape on the order of micrometers" of claims 17-18, Nilsson et al. ('783) discloses making a tungsten carbide-containing material with a powder size up to 1.1 micrometers, which is "on the order of micrometers" (col. 5, lines 4-14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

> the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 11-13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. (US 5,106,674).

In regards to claim 11, Okada et al. (‘674) discloses a blade member (structure) of tungsten carbide based cemented carbide having a hard phase of 5 to 60 weight percent of one or more of carbide and carbonitride of titanium, tantalum and tungsten and carbide and carbonitride of titanium, tantalum, niobium, and tungsten; a binder phase of 3 to 10 weight percent cobalt; with the balance being tungsten carbide (abstract and col. 2, lines 20-38). The Examiner notes that the composition disclosed by Okada et al. (‘674) overlaps the composition of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of tungsten carbide (carbon) and cobalt from the amounts disclosed by Okada et al. ('674) because Okada et al. ('674) discloses the same utility throughout the disclosed ranges.

In regards to claim 12, Okada et al. (‘674) discloses Vickers hardness values greater than 800 (Table 2).

With respect to the recitation "wherein the structure has a density of at least 10 g/cm^3" of claim 13, Okada et al. (‘674) is silent with respect to this property. However, Okada et al. (‘674) discloses substantially the same composition. Therefore, a density of at least 10 g/cm^3 would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein the number of pools having a size of at

least 5 μm and consisting of at least one element selected from the group consisting of cobalt, nickel, and iron is not more than one per 100 mm^2 of the surface of the structure" of claim 16, the Examiner notes that this recitation would not require any pools greater than 5 μm. Furthermore, Okada et al. ('674) discloses that the configuration of the cobalt-pool phase in the surface would effect the plastic deformation resistance (col. 4, lines 18-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the configuration of the cobalt-pool phase (which would include shape, size, and surface density) in order to achieve the desired plastic deformation resistance. MPEP 2144.05 II.

Claims 15-16 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nilsson et al. (US 5,681,783).

In regards to claim 15, Nilsson et al. ('783) discloses average grain sizes less than or equal to 1.1 micrometers, which overlaps "wherein the structure has an average grain size of 50 nm or less". Nilsson et al. ('783) further discloses that lower particle (grain) sizes provides improved mechanical properties (col. 5, lines 26-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to decrease the particle (grain) size in order to improve the mechanical properties. MPEP 2144.05 II.

With respect to the recitation "wherein the number of pools having a size of at least 5 μm and consisting of at least one element selected from the group consisting of cobalt, nickel, and iron is not more than one per 100 mm^2 of the surface of the

structure" of claim 16, the Examiner notes that this recitation would not require any pools greater than 5 μm.

With respect to the recitation "wherein the structure has a shape on the order of micrometers" of claims 20-21, Nilsson et al. ('783) discloses making a tungsten carbide-containing material with a powder size up to 1.1 micrometers, which is “on the order of micrometers” (col. 5, lines 4-14).

Claims 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nilsson et al. (US 5,681,783) with evidence from Rota et al. (Micro powder metallurgy for the replicative production of metallic microstructures).

In regards to claim 14, Nilsson et al. (‘783) discloses a high density tungsten carbide based material (structure) having at least about 5.0 to 6.05 weight percent carbon and 0 to 0.20 weight percent cobalt (col. 4, lines 28-45 and col. 5, lines 47-56). However, Nilsson et al. (‘783) does not specify the surface roughness that would result from the sintering of a tungsten carbide structure containing cobalt.

Rota et al. discloses that the surface roughness from sintering a tungsten carbide cobalt material would be between 0.6 μm and 4.5 μm, which overlaps the range of 1 μm or less (page 325, column 2).

Therefore, it would be expected that the surface roughness of the high density tungsten carbide based material (structure) having at least about 5.0 to 6.05 weight percent carbon and 0 to 0.20 weight percent cobalt, as disclosed by Nilsson et al. (‘783), would be between 0.6 μm and 4.5 μm, as disclosed by Rota et al., because Rota et al. discloses performing the same process to the same or substantially the same

material.

With respect to the recitation "wherein the structure has a shape on the order of micrometers" of claim 19, Nilsson et al. ('783) discloses making a tungsten carbide-containing material with a powder size up to 1.1 micrometers, which is “on the order of micrometers” (col. 5, lines 4-14).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John P. Sheehan/
Primary Examiner, Art Unit 1793

JR